CLAIMS

1. A porous honeycomb structure comprising:

a plurality of partition walls containing cordierite as a main component and comprising a porous ceramic having a porosity of 55 to 75% and an average pore diameter of 15 to 35 μm,

characterized in that pores of the partition walls have a pore distribution represented by the following condition formula (1):

$$Lr > 0.3 \times P/100 + 0.91 \quad \ldots \ (1),$$

"in the above condition formula (1), Lr means an average developed length ratio obtained by the following equation (2), and P means a porosity obtained from a total pore volume measured by a mercury press-in type porosimeter, assuming that a true specific gravity of cordierite is 2.52 g/cc:"

$$Lr = Lo/4 \quad \ldots \ (2),$$

"in the above equation (2), Lo means an average developed length (an average value of lengths including the surfaces of the pores opened in the partition wall surfaces) obtained when using a surface roughness measuring instrument and checking optional ten places on the partition wall surfaces every 4 mm (straight line length ignoring presence of the pores opened in the partition wall surfaces) along the partition wall surfaces with a stylus, and Lr means the average developed length ratio."

2. The porous honeycomb structure according to claim 1, wherein the pores of the partition walls have a tomographic pore distribution represented by the following condition formula (3) in a partition wall thickness direction:

$X < -33 \times P/100+28$ ... (3),

"in the above condition formula (3), X denotes an average value of a primary component amplitude spectrum (F) and a secondary component amplitude spectrum (S) obtained from the following equations (4) and (5), and P means a porosity obtained from the total pore volume measured by the mercury press-in type porosimeter, assuming that the true specific gravity of cordierite is 2.52 g/cc:"

$$F = \sqrt{X_{SRe}(1)^2 + X_{SIm}(1)^2} \quad \ldots (4)$$

"in the above equation (4), F denotes the primary component amplitude spectrum assuming k = 1 in the following conversion equation (6), and $X_{SRe}(1)$ and $X_{SIm}(1)$ denote a real part and an imaginary part, respectively, assuming k = 1 in the conversion equation (6):"

$$S = \sqrt{X_{SRe}(2)^2 + X_{SIm}(2)^2} \quad \ldots (5)$$

"in the equation (5), S denotes the secondary component amplitude spectrum assuming k = 2 in the

following conversion equation (6), and $X_{SRe}(2)$ and $X_{SIm}(2)$ denote a real part and an imaginary part, respectively, assuming k = 2 in the conversion equation (6),"

$$X_S(k)=\sum_{n=0}^{255}x(n)\left(\cos\frac{2\pi k}{256}\cdot n-j\sin\frac{2\pi k}{256}\cdot n\right)\quad\cdots(6)$$

"in the conversion equation (6), $X_S(k)$ denotes a discrete Fourier transform, k denotes a degree, n denotes an integer of 0 to 255 indicating a divided position, when a partition wall section is divided into 256 in order in a thickness direction from a partition wall outermost surface portion (n = 0), and X(n) denotes an area ratio occupied by a pore portion in a partition wall section region to the divided position of n to n+1."

3. The porous honeycomb structure according to claim 1 or 2, wherein a thickness of the partition wall is 350 μm or less.

4. The porous honeycomb structure according to any one of claims 1 to 3, wherein a coefficient of thermal expansion at 40 to 800°C is 1.0×10^{-6}/°C or less.